

**CLAIMS:**

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*ad* 1. A method of operating a multi-level cache of a computer system, comprising the steps of:

5 monitoring cache activity of an upper level cache and a lower level cache both associated with a processor of the computer system;

issuing a request from the processor to load a value, wherein the request misses the upper level cache and the lower level cache; and

10 selecting a victim cache block in the lower level cache for receiving the requested value based at least in part on prior cache activity of the upper level cache.

2. The method of Claim 1 wherein the victim cache block is further selected based in part on the cache activity of the lower level cache.

3. The method of Claim 1 wherein said selecting step takes place out of a critical path of execution of a core of the processor.

20 4. The method of Claim 1 wherein said issuing step issues a request to load operand data.

5. The method of Claim 1 wherein said selecting step includes the step of identifying a less recently used cache block in the lower level cache.

25 6. The method of Claim 1 further comprising the steps of:  
returning the requested value to the processor;  
determining that it would be efficient to currently load into the upper level cache a cache line which includes the requested value; and

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a2 in response to said determining step, loading the cache  
line into the upper level cache.

7. The method of Claim 1 wherein:  
said monitoring step monitors cache misses of the upper  
level and lower level caches; and  
said selecting step selects the victim cache block based  
at least in part on the cache misses of the lower level cache.

8. The method of Claim 1 wherein:  
said monitoring step monitors cache hits of the upper  
level cache; and  
said selecting step selects the victim cache block based  
at least in part on the cache hits of the upper level cache.

9. The method of Claim 8 wherein:  
said monitoring step also monitors cache misses of the  
upper level and lower level caches; and  
said selecting step selects the victim cache block based  
in part on the cache misses of the lower level cache.

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a3 10. The method of Claim 8 further comprising the step of  
selecting a victim cache block in the upper level cache for  
receiving the requested value based at least in part on the  
cache activity of the lower level cache.

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11. A computer system comprising:

a system memory device;

means for processing program instructions;

means, connected to said processing means, for caching  
5 values stored in said system memory device, said caching means  
having at least an upper level cache and a lower level cache  
both associated with said processing means;

means for monitoring cache activity of said upper level  
cache and said lower level cache; and

10 means for selecting a victim cache block in said lower  
level cache for receiving a value specified in a load request  
issued by said processing means, wherein the load request  
missed said upper level cache and said lower level cache,  
based at least in part on the cache activity of said upper  
level cache.

12. The computer system of Claim 11 wherein said  
selecting means is located out of a critical path of execution  
of a core of said processing means.

13. The computer system of Claim 11 wherein said upper  
20 level cache is an operand data cache.

14. The computer system of Claim 11 wherein said  
selecting means identifies a less recently used cache block in  
said upper level cache.

15. The computer system of Claim 11 wherein:  
25 said upper level cache is an L1 cache; and  
said lower level cache is an L2 cache.

16. The computer system of Claim 11 wherein said upper  
level cache is a store-through cache.

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17. The computer system of Claim 11 further comprising:  
means for returning the requested value to said  
processing means in response to the load request missing said  
upper level cache; and

means for loading a cache line which includes the requested value into said upper level cache in response to a determination that it would be efficient to currently load the cache line into said upper level cache.

18. The computer system of Claim 11 wherein:  
said monitoring means monitors cache misses of said lower  
level cache; and

said selecting means selects said victim cache block based at least in part on the cache misses of said lower level cache.

19. The computer system of Claim 11 wherein:  
said monitoring means monitors cache hits of said upper  
level cache; and

said selecting means selects said victim cache block based at least in part on the cache hits of said upper level cache.

20. The computer system of Claim 19 wherein:  
said monitoring means also monitors cache misses of said  
upper level and lower level caches; and

said selecting means selects said victim cache block based in part on the cache misses of said lower level cache.

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21. The computer system of Claim 19 further comprising means for selecting a victim cache block in said upper level cache for receiving the requested value based at least in part on the cache activity of said lower level cache.